

KERATINOCYTE & SKIN PHYSIOLOGY

Y. Barrandon, Ecole Polytechnique Fédérale de Lausanne, Switzerland

Reconstruction skin from stem cells

Skin is a complex self-renewing organ with multiple functionalities. It contains a number of specialized cells that are working together in a spatiotemporal manner to maintain skin integrity and homeostasis. Resident tissue stem cells present in adult skin are natural target for skin reconstruction and regenerative medicine assuming that they can be expanded *ex vivo*. Specialized skin cells can also be derived from embryonic stem cells or induced pluripotent stem cells (iPS) using specific differentiation protocols or by reprogramming non-skin adult stem cells. For instance, non-hairy squamous epithelia (cornea, conjunctiva, oral cavity, oesophagus, vagina) contain clonogenic stem cells that can generate epidermis, sebaceous glands and cycling hair follicles in response to skin developmental signals. Most importantly, this capacity is maintained in serial transplantation and is intrinsic as stem cells that have never been exposed to cell culture behave in a similar fashion. Even more surprising, thymic clonogenic epithelial cells of endodermal origin can acquire the functionality of bona fide multipotent stem cells of the skin when exposed to proper developmental signals. These observations indicate that either multilineage priming or reprogramming can account for the change in fate of epithelial stem/progenitor cells in response to an inductive skin microenvironment.